FIVE-YEAR REVIEW REPORT

SYNTEX VERONA FACILITY

VERONA, MISSOURI

Prepared By:

United States Environmental Protection Agency

Region VII

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I. INTRODUCTION

Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and as implemented by section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that periodic (at least once every five years) reviews be conducted for sites, where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use or unrestricted exposure, following the implementation of response actions for the site. The purpose of such review is to determine the continued adequacy of the response actions implemented in providing protection of human health, welfare and the environment. This report presents the Five Year Review for the remedial action for the Syntex Facility site near Verona, Missouri. This review covers the two operable units at the site, although the remedial actions have not been completed at operable unit one (OU 1) and the ground water monitoring has not been started at operable unit two (OU 2).[1]

The five-year review is to be conducted by the lead agency which is the United States Environmental Protection Agency, Region VII (EPA), for the Syntex Facility - Verona Site. For statutory sites, like this one, five-year reviews are to be started within five years of the initiation of the final response actions for the site.

The EPA has established three levels of review for five-year reviews. Level I is the lowest level of evaluation of protectiveness, Level II is the intermediate level, and Level III is the highest level of evaluation of protectiveness. A Level I analysis will be appropriate in all but a relatively few cases where site-specific circumstances suggest another level. For example the absence of the expected reduction in contaminant levels, as monitored, may suggest a Level II evaluation of the source control remedial component. Level III will rarely be proposed until the review is underway and site conditions dictate a more intensive review of the remedy. Site specific considerations, including the nature of the response action, the status of onsite response activities, and the proximity to populated areas and sensitive environmental areas determine the level of review for a given site. A Level I review is appropriate for the Syntex Facility - Verona site based on the reduced levels of contaminants found in Spring River fish, the reduction of toxicity achieved at the site through remediation of contaminated soils, and the contaminant reduction achieved through decontamination of contaminated equipment. In general, the remedy has performed as expected with the exception of the final disposal of the contaminated equipment.

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[1] This contradicts a statement in the Record of Decision for OU 2 which says a separate five year review will be done for each operable unit. The EPA, for efficiency reasons, has decided to combine the reviews of both of the operable units pursuant to guidance.

A. Site History and Conditions

The Syntex Agribusiness, Inc. (Syntex) facility is located west of the city of Verona, in south-central Lawrence County in southwest Missouri. The facility occupies approximately 180 acres, primarily along the east bank of the Spring River, which flows northward through the length of the property.

Most of the active portion of the facility is located within protected areas of the 100 year Spring River floodplain. The area is characterized by karst topographic features such as solution cavities and springs.

The industrial facility is surrounded on three sides by property used for agricultural purposes. To the east of the site are the residential areas of the city of Verona. Scattered residences are located within the Spring River floodplain down gradient from the site. The Spring River is used for recreational and industrial purposes within southwestern Missouri.

In the 1960's, Hoffman-Taff, Inc. owned and operated the facility. Hoffman-Taff produced 2,4,5 Trichlorophenoxy-acetic acid (2,4,5-T) for the U.S. Army as part of the production of the defoliant commonly known as Agent Orange. In 1969, Hoffman-Taff leased a portion of the building at the facility to Northeastern Pharmaceutical and Chemical Company (NEPACCO) for the production of hexachlorophene. In 1969, Syntex purchased the facility at Verona from Hoffman-Taff.

The production of 2,4,5-T and hexachlorophene involved the intermediate production of 2,4,5-Trichlorophenol (TCP) and the potential formation of 2,3,7,8 tetrachlorodibenzo-p-dioxin (dioxin). In the course of purifying the hexachlorophene, still bottom wastes were created which would have collected the TCP and dioxin. These waste streams were managed in storage tanks and lagoons onsite.

The site was placed on the proposed National Priorities List (NPL) on December 30, 1982 (Federal Register Volume 47, Number 251). On September 8, 1983, the NPL designation became final (Federal Register Volume 48, Number 175). The principal threats posed by the site were direct contact (ingestion, inhalation and dermal) with dioxin contaminated soil and wastes by humans and wildlife. The dioxin contaminated soils, liquids, and sludges were also a potential source for groundwater contamination.

The site also has an active plant which produces food additives for human and animal foods and is an active RCRA facility. The production plant was sold by Syntex in the fall of 1996 to a Dupont/Con Agra conglomerate identified as DuCoa, L.P.. Syntex maintained ownership of certain portions of the site, including the Trench area, and also maintained the environmental responsibility for all actions associated with the Superfund site.

B. Summary of Response Actions (Site Cleanup)

EPA and Syntex entered into an administrative order on consent in September, 1983, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, and Section 3013 of RCRA, 42 U.S.C. § 6934. The order required the following actions:

- posting of warning signs around specified disposal areas;
- development and submittal of a Sampling and Analysis Plan (SAP) to define the nature and extent of dioxin contamination;
- implementation of the SAP upon approval by EPA;
- development and submittal of a Fish and Sediment Sampling Plan (FSSP) upon approval by EPA;
- implementation of the FSSP upon approval by EPA;
- preparation and submittal of a Remedial Alternatives Report;
- preparation and submittal of an Implementation Plan that would include plans and specifications for the preferred remedial alternative(s), schedule for implementation and reporting, description of the necessary reports and safety plans.

In 1988, the EPA divided the site into two separate operable units. The contaminated soils and equipment were addressed under OU 1, while the ground water contamination was addressed by OU 2.

In May 1988, EPA issued a Record of Decision (ROD) for OU 1 that selected remedial actions for cleanup of contaminated soils and equipment at the facility, and associated ground water monitoring. Pursuant to the 1983 administrative order, EPA, the Missouri Department of Natural Resources (MDNR) and Syntex developed an Implementation Plan to achieve the cleanup measures proposed in the ROD for OU 1.

The selected remedy under OU 1 was to provide protection of the environment by preventing the mobilization of dioxin-contaminated soils to the Spring River. Protection to human health would be accomplished by preventing exposure to contaminated materials through soil removal, decontamination and disposal of equipment, and capping of contaminated areas. Dioxin contaminated soils in excess of a 20 parts per billion (ppb) action level would be removed and treated.

Cleanup measures began in June 1988, with the excavation of dioxin contaminated soils at four former storage areas within the Spring River floodplain. The four areas included the Burn area, the Irrigation area, the Lagoon area and the Slough area. Approximately 860 cubic yards of

dioxin contaminated soil was transported to the EPA Mobile Incineration System and thermally treated. The excavated areas were then backfilled with clean topsoil and a vegetative cover was established. Remediation of these contaminated soils was completed in 1989.

Dioxin contaminated soils located in the Trench area on bluffs west of the Spring River were capped in place with a 12-inch topsoil layer which supports a vegetative cover. In addition, a gravel drainage interception trench was installed up gradient from the trench area to restrict contaminant migration. Five ground water monitoring wells were installed around the Trench area for post soil remediation ground water monitoring. The monitoring well configuration consists of an up gradient well (MW-11), two down gradient wells (MW-17, MW-18), and two flanking down gradient wells (MW-12, MW-13). Wells MW-17 and MW-18 were completed in bedrock and screened across the alluvium/bedrock contact. The activities associated with the Trench area were also completed in 1989. In 1996, additional work was initiated to replace several wells around the Trench area as well as install wells in order to collect better information regarding the ground water around the Trench area. Wells MW-12, MW-13, and MW-17 were replaced with closely located similar wells. Well MW-18 was modified and two new wells were installed. Well MW-19 was installed as a new down gradient well and well MW-20 was installed as a new up gradient well. There are now six wells surrounding the Trench area (MW-11, MW-12, MW-13, MW-17, MW-18, MW-19 and MW-20).

In 1995, all equipment and debris was removed from the Spill area and the area was covered with an asphalt cap. No excavation was required in this area because the concentration of dioxin contamination was below the 20 ppb action level. The original plan called for a vegetative cap, but the owner wished to use the area for parking and movement of vehicles and equipment so an asphaltic cap was substituted. EPA and the State agreed that this cap would be just as protective as a vegetative cap. The cap will be maintained in perpetuity.

Decontamination procedures were developed to clean the contaminated NEPACCO and photolysis equipment. The procedures were implemented and approximately 75% of the equipment was treated. The land disposal restrictions posed problems in the disposal of the treated equipment. In 1996, a determination was made by EPA, under the hazardous debris rule, that the developed procedures would adequately protect human health and the environment and allow the treated equipment to be disposed as a solid waste. All of the equipment has been properly treated and disposed. One last contaminated area, the T-1 dike, is currently being removed and disposed. Final actions for completion of the work in the areas where equipment was stored and treated are underway.

An eight foot chain link fence was erected around the perimeter of the site to limit access. Land use restrictions have been placed on the title to the facility's property to maintain the industrial use status. These actions have greatly reduced the likelihood of direct exposure to hazardous substances which remain in the soils at the site.

The EPA issued a ROD for OU 2, in April, 1993 which stated that no further action would be taken with respect to the ground water contamination at the Syntex Verona site. The

ROD for OU 2 stated that ground and surface water monitoring would be conducted for two years and an assessment would be done to ensure that the remedy remains protective of human health and the environment. The EPA has entered into an administrative order on consent (AOC) with Syntex for the completion of this work. Syntex has continued monitoring the existing ground water wells and contaminant concentrations are decreasing. However, it is premature to assess the actions for OU 2 since they have not been fully implemented. An assessment will be done in the next five year review.

The State of Missouri has also implemented institutional controls on the site limiting changes in land use by placing the site on a State registry. The Syntex Verona site has been placed on the Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri as the "Syntex Facility (Verona) Site". The site is currently classified on the Registry as a Class "II" site, priority 11, meaning it is the eleventh priority of the class II sites. Class II sites are sites that are a significant threat to the environment where action is required. Missouri Code section 260.465 describes the authority of the Missouri Department of Natural Resources with respect to use and transfer of sites on the Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites. There are no specific restrictions for this site. In summary, a person shall not substantially change the manner in which a Registry site is used or sell or transfer title of a Registry site without written approval of the Director of the Missouri Department of Natural Resources.

In April 1997, as part of a trenching operation near a small electrical building at the Site, soil was excavated for the purpose of burying elevated power lines. Since the electrical building had historically stored PCB transformers and leaks from the transformers had occurred, a composite sample was taken of the excavated soil to determine the presence or absence of PCB contamination. Analysis of the soil sample indicated the presence of PCBs at 1000 parts per million. In response to the discovery of PCB contamination, EPA issued a Removal Action Memorandum on July 17, 1997, identifying the response actions necessary to address the PCB contamination. The removal action activities will be conducted by Syntex and are included in the administrative order on consent mentioned above with regard to the ground water monitoring. Under the AOC, Syntex will conduct the ground water monitoring actions for OU 2, and the PCB removal actions, which should complete all response activities at the Site.

II. REMEDIAL OBJECTIVES

Remedial action objectives consist of medium-specific or operable unit specific goals for protecting human health and the environment. Although the remedial objectives were not specifically delineated in the RODs for OU 1 or OU 2 the following were the remedial objectives for the activities conducted at the Syntex Verona site:

A. Reduce exposure to contaminated soils at the site, specifically dioxin contamination.

B. Reduce contamination of onsite groundwater by addressing contaminated soils.

C. Reduce exposure to materials and equipment contaminated with dioxin.

D. Reduce exposure to dioxin in fish in the Spring River.

E. Assess the ground water contamination to assure protectiveness.

Objectives A and B were addressed by excavation and removal of the contaminated soils in the Burn, Irrigation, Lagoon and Slough areas. All soils above 20 ppb dioxin were removed and transported to the EPA Mobile Incineration System located at Denny Farm in southwest Missouri. These two objectives were also addressed with regard to the Spill and Trench areas. An asphalt cap was placed over the contamination in the Spill area providing appropriate protection. The contamination in the Trench area was covered with a vegetative cap and a gravel drainage interception trench was constructed. In addition, ground water monitoring wells were placed around the Trench area to monitor any contaminant migration. The ground water monitoring has shown no dioxin contamination. Acetone was detected in the ground water monitoring wells surrounding the Trench area in 1992 and 1993 at levels of concern. However, no acetone was discovered in subsequent sampling in 1994, 1995, or 1996. It was determined that the acetone problem was caused by contaminated sampling equipment.

Objective C was addressed as part of the remedial action by decontamination of contaminated equipment used in the production processes. Three types of forced velocity washes were done on the contaminated equipment depending on the type of service the equipment was in during its last use. Either a detergent, solvent, or acid wash was done on the equipment or a combination of the three. After cleaning, the exterior of the equipment was wipe sampled to determine contaminant concentrations. All of the equipment has been treated and disposed.

The human consumption of fish from Spring River which had been exposed to dioxin contamination was restricted in order to address objective D. Concurrent with the remedial action for OU 1, the Missouri Department of Health (MDOH) issued a health advisory against consuming fish caught from the Spring River adjacent and downstream from the facility. Fish sampling was conducted annually to monitor dioxin concentrations in fish tissues. Analysis of fish fillets indicated a maximum level of 40 parts per trillion (ppt) dioxin in 1982, which had decreased to 4.8 ppt dioxin by 1987. Sampling data collected following implementation of the OU 1 remedial action suggest that dioxin concentrations in fish fillets have been further reduced. This data prompted MDOH, on May 18, 1993 to rescind the health advisory on the consumption of Spring River fish.

Objective E will be addressed by OU 2 which has not been fully implemented at this time. Future monitoring activities are anticipated to meet this objective.

III. SUMMARY OF SITE VISIT

Site visits have been performed on a regular basis by EPA representatives through field oversight of quarterly ground water sampling activities required to conduct the RI/FS for OU 2. A field inspection of the site and interviews of the plant personnel regarding operation and maintenance of the remediated areas was conducted in March 1993 by members of the MDNR and MDOH. Interviews conducted during that inspection confirmed that land use restrictions were still in place and that the site remains on the State of Missouri Registry of Abandoned or Uncontrolled Hazardous Waste Disposal Sites.

The site was visited on June 8, 1995, by the remedial project manager (RPM). The purpose of the visit was to perform an inspection in order to initiate the five year review process. A representative of the MDNR accompanied the RPM on this site visit. During the site visit the RPM made the following observations relating to the current status of the Site and the continued protectiveness of the Response Actions:

A. The soil and vegetative covers were intact and in good condition. Very thick vegetation was found in all areas of soil removal.

B. The fence around the site was guarded and in good condition.

C. The monitoring wells on the site were observed and looked to be in good condition and functional. Three new ground water monitoring wells had been installed under the NPDES permit.

D. The Spill area and Irrigation area were identified as exclusion zones due to the presence of dioxin contamination in these areas. The equipment being addressed by this action was located in the Spill area and the Irrigation area. Some decontaminated equipment had been placed in the Irrigation area after the contaminated soil had been removed from the area and the area capped. Since the equipment was placed on the cap, once the equipment is removed from the Irrigation area the integrity of the cap will need to be determined. No visible signs of any problems with the integrity of the Irrigation area cap were observed. A large covered building adjacent to the Irrigation area will be used for the remaining decontamination of the equipment. This building houses some of the equipment along with contaminated water used in the decontamination process. Drums of wastes are also stored in this building. Syntex is planning proper disposal of the contaminated water and drummed wastes. The remainder of the equipment is laying on the ground in the Spill and Irrigation areas. Much of the equipment has been cut up into smaller pieces for easier handling. All of the equipment has specific identification numbers.

The site has been inspected by the RPM on several occasions since that date, the most recent being on June 12, 1997. The following observation were made with regard to changes since the inspection to begin the five year review:

A. The soil and vegetative covers are still intact and in good condition. Very thick vegetation was found in all areas of soil removal.

B. The fence around the site is no longer guarded but is still in good condition.

C. The monitoring wells on the site were observed and looked to be in good condition and functional. Two new ground water monitoring wells had been installed around the Trench area, and three wells around the Trench area were modified to provide better monitoring information.

D. All contaminated equipment was decontaminated and disposed.

E. The Spill area and Irrigation area were capped. The caps are in good condition. The building located in this area (building 25) is being decontaminated and will remain for use at the facility. Most of the waste located in the building has been disposed and the remaining waste will be properly disposed upon completion of the decontamination activities. The T-1 dike located near the Spill area is being decontaminated and disposed.

IV. AREAS OF NON COMPLIANCE

No areas of noncompliance with the remedial action objectives were noted at the site. The implementation plan for the ground and surface water monitoring has been finalized.

No deficiencies or deterioration in the Response Actions for the Site were found in this five-year review. The asphalt and vegetative covers are intact. Land use has not changed for the site since the initiation of the response actions and no future changes are anticipated from the original industrial use. No specific or general deficiencies were identified in this five-year review which need to be addressed.

V. RECOMMENDATIONS/TECHNOLOGY

Based on the site visit, consultation with the MDNR and document review the recommendations identified for the Syntex Verona site are as follows:

1. Continued maintenance of the capped areas and vegetative cover.

2. Continued monitoring of the groundwater around the Trench area.

3. Performance of the ground and surface water monitoring activities in accordance with the approved implementation plan.

4. Completion of the removal action to address the PCB contamination.

All technologies involved in these recommendations are well established technologies so no technological problems are anticipated. No other recommendations or actions are necessary at this time.

VI. CERTIFICATION OF PROTECTIVENESS

The remedy at the Syntex Verona site is protective. The response actions completed by Syntex, together with the future response actions and long-term maintenance and monitoring being provided by Syntex and the MDNR, will continue to protect human health, welfare and the environment at this site. No new or significant information was discovered during this review to indicate that the remedy will not continue to be protective. The asphalt and vegetative covers installed over the remediated areas have been adequately maintained and continue to perform as designed. Institutional controls placed on land use continue in place while access to the property has been restricted. Reduced dioxin levels in Spring River fish has prompted MDOH to repeal the health advisory against the consumption of fish caught from the Spring River.

VII. NEXT REVIEW

EPA believes that five-year reviews will continue to be necessary at this Site, since hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use or unrestricted exposure. Accordingly, EPA plans to perform another five-year review beginning in 1998.

VIII. IMPLEMENTATION REQUIREMENTS

Since further actions are necessary to complete the remedial action at the Syntex Verona site, implementation requirements are obligatory. The implementation of the actions to complete the work in the areas where the contaminated equipment was located will proceed pursuant to the approved procedures in the Implementation Plan. The implementation of the ground water monitoring in the Trench area and maintenance of the other capped areas (Burn, Lagoon, Slough, Spill and Irrigation areas) will continue. The ground and surface water monitoring activities will

be conducted pursuant to the implementation plan for these activities. The PCB contaminated materials will be removed. No problems with implementation are anticipated.

All of the implementation will be completed by Syntex with oversight by EPA and MDNR. The implementation for OU 1 should be completed in 1997, and OU 2 implementation should be completed in 1999. The implementation of these activities will satisfy and complete all of the necessary recommendations.

EPA intends to develop a Fact Sheet after it signs this five year review report. This Fact Sheet will be sent to individuals or organizations on the mailing list developed for this site and will state that EPA has completed a five year review for the site. The Fact Sheet will also explain that the response actions taken to date and the planned future response actions for this site continue to protect human health, welfare and the environment and will note the next five year review is planned for 1998. This five year review report will be added to the record.

IX. QA/QC

Appropriate quality assurance and quality control procedures were performed in conjunction with all activities associated with the five year review. All activities maintained acceptable quality standards.

X. REFERENCES

In addition to the Site visits, the following documents, data and information were reviewed in completing the five-year review:

A. The two RODs, in which EPA determined the final response actions at the site for operable units 1 and 2, including all attachments.

B. The Implementation Plan for OU 1.

C. The Implementation Plan for OU 2.

D. The 1983 Consent Agreement between EPA and Syntex.

E. The 1997 Administrative Order on Consent between EPA and Syntex.

F. The Land Disposal Restrictions for Hazardous Debris.

G. Historical and current analytical data on the Site including the most recent analytical data on the groundwater samples collected by Syntex.

H. EPA guidance for conducting five-year reviews and other guidance and regulations pertaining to the protectiveness of the remedial actions.

EPA also consulted with the Missouri Department of Natural Resources both before and after initiating the five-year review to solicit and include their opinions.

Diane K. Callier 9/30/97

for Dennis Grams, P.E. Date
Regional Administrator